REMARKS

This Request for Reconsideration is filed in response to the Office Action of July 12, 2004 in which claims 1-27 were rejected on various grounds.

Before remarking on the substance of the various rejections, a few words are appropriate about the nature of the claims and what their fundamental coverage is. Independent claims 1 and 15 are similar in that one is a method and another is an arrangement for determining *a distance* between a transmitting station and a receiving station (see preambles of claims 1 and 15). In both claims 1 and 15, the distance is determined by both a measurement of a feature of the signal transmitted from a transmitting station to a receiving station and computing or defining the distance between the transmitting station and the receiving station based both on the measurement of the feature of the signal and a characteristic parameter of the radio propagation environment of the receiving station. Notice that the fundamental dimension being determined is distance, i.e., length. While it is true that the claimed determination of distance may be combined with other information to determine position, it is not position that is being determined in claims 1 and 15. Position means a point or area occupied by a physical object such as a mobile phone. Distance means the degree or amount of separation between two points measured along the shortest path joining them.

Regarding claim 23, it also is concerned with facilitating a determination of the distance between a mobile station having a radio connection with at least one base station by receiving measurement data concerning a feature of the connection and a characteristic parameter describing the radio propagation environment of the base station. Similarly, claim 24 has to do with calculating a parameter of the radio propagation environment by means of a current geographical location of a first station and a feature of the radio signal received by the first station or a second station communicated by radio with the first station. Thus, all four independent claims contain the limitation that a measurement of a feature of a signal indicative of distance is made and that

measurement is combined with or used to calculate a parameter of the radio propagation environment of a receiver.

Therefore, all of the claims have to do with either the actual computation of the distance based on the measured signal feature and the characteristic parameter or a way to determine the characteristic parameter for use in such a computation.

It is true that the present specification addresses the problem of how to provide location determinations with accuracy and simplicity but it does so at a more fundamental level by treating the problem of the underlying distance measurement itself. The prior art cited by the Examiner, i.e., Reudink et al also has to do with solving this problem. But Reudink et al does not deal with the fundamental distance measurement itself. Rather, Reudink et al has to do with solving the problem of accurately determining the two-dimensional position of a mobile unit operating within a predefined service area. Reudink et al does this by using a combination of distance measurements, antenna sectoring, and prestored mapping information for a given sector. It is only necessary to consider the first embodiment of Reudink et al because Reudink's second and third embodiments do not utilize the information map that Reudink uses to identify attributes with particular positions in order to accurately pinpoint the position of the mobile unit. See column 4, lines 1-12.

The Examiner states that Reudink et al compute the distance between the transmitting station and the receiving station using the measured signal feature (referring to column 3, lines 50-57; column 6, lines 9-20; and column 7, lines 9-20) and the characteristic parameter describing the line-of-sight conditions of the receiving station, referring to column 7, lines 27-67. However, what Reudink et al is actually describing here is a determination of position, not distance. The passage cited at column 3, lines 50-57 merely states that the mobile's position is determined based on several factors including distance. It is not distance itself that is being determined, unlike the presently claimed invention.

Notice that Reudink et al mention that signal strength is used to determine a distance from the BTS and notice particularly that Reudink et al does not say

that signal strength and something else is used to determine distance from the BTS. The present invention is directed to that "something else," i.e., the characteristic parameter for the radio propagation environment of the receiving station. Reudink et al do not show or suggest computing the distance between the transmitting station and the receiving station using the measured signal feature and the characteristic parameter of the radio propagation environment of the receiving station. Rather, Reudink et al use multiple narrow beams in conjunction with signal strength and/or time difference of arrival information to determine the location of a mobile communication unit (see column 3, lines 16-19).

Considering the foregoing remarks, it will be realized that it is important to make a distinction between the fundamental determination of distance, as presently claimed, and the determination of geographical position as shown by Reudink et al.

It is also incorrect to state that the system of Reudink et al provides means for determining the extent of space between the transmitting BTS and the mobile unit with the signal strength information which determines the position of the mobile. Rather, Reudink et al uses the signal strength information to determine distance and then combines that information with the prestored map information and information about the signal strength in different narrow beam antenna sectors to arrive at position.

The Examiner admits that Reudink et al does not explicitly disclose determining a characteristic parameter of the radio propagation environment of the receiving station but points to the use of a road map that includes different signal attributes as related to the various environments encountered by the movement of the mobile device (column 3, lines 25-50; column 6, lines 52-58). However, Reudink et al do not determine a characteristic parameter for the environment but rather an information map containing a great many positions and their associated communication attributes recorded through the use of a test system (see column 8, lines 43-46). Notice again that these communication attributes of the great many positions within a given sector is information that is

used by Reudink et al along with a signal strength measurement and knowledge about different antenna sectors to come up with a position determination, which is different from the fundamental thing that is being claimed by applicant which is distance itself.

Thus, Reudink et al disclose a system for mobile location estimation and disclose the possibility of developing an information map for a base station coverage area and also that this information map could be used in a system and method utilizing multiple narrow beams in conjunction with signal strength and/or time difference of arrival information to determine the location of a mobile communication unit. However, Reudink et al do not disclose or suggest use of the core feature of the present invention, i.e., a characterizing parameter for the radio propagation environment of the receiving station such that the parameter can be used for computing the distance between the two stations using at least one feature of a signal received from the transmitting station at the receiving station, the feature being such that it can be used for determination of the distance between the transmitting station and the receiving station.

When considering the overall disclosure of Reudink et al, see for example column 3, lines 28-42 and column 7, lines 27-34, or claim 1, it is to be noted that in the invention of Reudink et al an information map is developed throughout the coverage area of one multi-beam base transceiver station (BTS). Reudink makes it clear in column 8, lines 31-36 that the invention thereof cannot be used in a typical omni or three-sector system, thus already at this point making it clear to the skilled person that the information map thereof is of no help if the skilled person aims to improve the accuracy of location determinations in a typical cellular system.

The Reudink information map includes a substantial amount of various information such that it can be used to locate a mobile unit in situations where the signals thereof are measurable at only one multi-beamed base station. This means that a very detailed information map needs to be developed for the BTS coverage area, the map including substantial amounts of information for the

different locations throughout the BTS coverage area. This is not necessary in the present invention.

When comparing the novel feature of the present invention to the prior art, such as Reudink, the novel feature should be interpreted in line with the description of the application. The meaning of the characteristic parameter is given on page 14, lines 1-11 and page 19, line 27 to page 20, line 16. On page 14 the application explains that the characteristic parameter characterizes the different excess path lengths in each of the radio coverage areas. On pages 19 to 20 it is explained that the actual values of information parameters σ_n^2, σ_v^2, and μ_v, could correspond to a few different levels corresponding to some predefined values, for example: "excellent," "good", etc. The radio coverage areas can then be classed accordingly (see claim 10). Therefore, the wording of claim 1 can clearly be interpreted as implying the characteristic parameter as describing the line-of-sight conditions of the environment by means of one of several discrete levels on a gradual scale for the purposes of characterizing the line-of-sight conditions by a value describing the excess path lengths caused by obstacles in the area. This is different from the complicated information maps of Reudink.

The referenced section of column 6 of Reudink (lines 52-67), although mentioning that an information map may be made by recording various communication attributes of a signal received at the base station while a test system is operated within the service area thereof, still does not teach or hint that a line-of-sight (LOS) condition of a receiving station could be described by means of a parameter for the radio propagation environment of the receiving station, and that this parameter could be used in a computation of distance along with a measured feature of a signal received from the transmitting station at the receiving station, the feature being such that it can be used for determination of the distance between the transmitting station and the receiving station.

It should also be appreciated that although column 3 of Reudink mentions road map information, or other representations of common position possibilities, which could be used in combination with direction information with respect to the movement of the mobile unit to determine the mobile position, there is no

disclosure of how the road map information is used, and most certainly no disclosure or even hint of how road map information could be used when computing a distance between two stations. At most, the skilled person might understand the teachings of Reudink to mean that a location area with the accuracy of a BTS or a beam thereof can be selected based on the road map information whereafter the information map of the BTS is used for the actual location determinations. In other words, Reudink et al do not teach or even hint that the road map information could be used in a computation of distance as such, or that the road map information could be in the form of a characteristic parameter describing the line-of-sight conditions of the radio propagation environment of the receiving station.

The characterizing parameterization in the present invention is not only nonobvious from Reudink but also adds a clear advantage over the prior art. The use of different characterizing parameter values for different line-of-sight conditions provides a simple and easy-to-implement arrangement for more precisely describing the line-of-sight propagation conditions in each cell. There is no need for complicated measurement and mapping as proposed by Reudink, but the parameters might be assigned for the cells, in the simplest form, based on knowledge and experience. Since only one additional parameter is required for computations on a per cell basis, the computations themselves can be kept substantially simple and no interpolation such as those suggested by Reudink are necessary. Therefore, the true distance between the transmitting and receiving stations can be determined fundamentally or accurately and efficiently with substantially low investment cost and without any additional equipment.

The applicant therefore submits that the invention of claim 1 and the other independent claims rejected under 35 U.S.C. 103(a) is inapplicable and the claimed invention would not have been obvious for the person of ordinary skill in the art based on Reudink et al, at least for the above reasons.

Regarding the dependent claims of claim 1, i.e., claims 2-14, claim 2 claims that the method of claim 1 further comprises a step of determining the current geographical location of the transmitting station. This means using a

source of location information that is external to the transmitting station and the receiving station and which may be used in a manner similar to that claimed in independent claim 24 to determine the parameter itself. This is different from what is shown by Reudink et al.

Regarding claims 3-4, it has already been pointed out that the second and third embodiments of Reudink et al do not use the detailed mapping information of Reudink's first embodiment. Therefore, the portions of Reudink that disclose using more than one base station are not applicable.

Regarding claim 9, the same may be said as was said above concerning claim 8. Additionally, the Examiner admits that Reudink et al do not explicitly disclose steps of using a weighted least square method for calculating a location of the transmitting station, wherein a used weighting matrix is an inverse of an error covariance matrix. The Examiner states that a weighted least square method is well known in the art of telecommunications but does not provide any concrete evidence and merely states that it would have been obvious to use a conventional LSM program, which is known to require a function and point coordinates with their measuring uncertainties, and it assumes that all point uncertainties are known and may be different, in order to find curve parameters and their uncertainties and hence provide extra features to make more accurate calculation of the mobile position. However, there is no concrete evidence presented by the Examiner to support these assertions and moreover the fundamental distance measurement claimed in claim 1 is completely absent from Reudink et al, as pointed out above.

Regarding claim 10, the portions of Reudink et al that describe several stations, i.e., the second and third embodiments of Reudink et al are described by Reudink et al as not being susceptible to use with a location map such as described in the first embodiment of Reudink et al and therefore claim 10, which depends from claim 1, is nonobvious because it contains the limitation of claim 1 relating to the characteristic parameter for the radio propagation environment of the receiving station and Reudink et al say their complicated mapping is not useable in a multiple base station scenario. Moreover, the step of classifying the

stations in different radio propagation classes wherein the characteristic parameter is based on the class of the station is a completely new concept which simplifies the entire process of determining distance between a transmitting station and a receiving station and which is not shown or even hinted by Reudink et al.

Regarding claim 11, the information conveyed by Reudink et al to a BCS or MSO is location information, not a distance determination made with the aid of a characteristic parameter of the radio propagation environment.

Regarding claim 13, the same may be said for claim 13 as was said above in connection with claim 2. The same pertains to claim 14. Withdrawal of the 35 U.S.C. § 103 rejection of claims 1-14 is requested.

Regarding claim 19, it depends from claim 15 which is an independent arrangement similar to claim 1. The applicant has had some difficulties in understanding how independent claims 15 and 23 which clearly define storage and use of the characteristic parameter describing the radio propagation environment of the receiving station are anticipated by Reudink while claims 1 and 4 being limited in a similar way to a characteristic parameter describing the radio propagation environment of the receiving station are not anticipated, especially when the novelty of this feature has been acknowledged by the Examiner himself. Nonetheless, the following remarks will treat the rejection of claims 15 and 23 and the dependent claims of claim 15 (except for claim 19) as being rejected for lack of novelty.

On page 12 of the Office Action the claims 15-18 and 20-23 are rejected under 35 U.S.C. § 102(e) as being anticipated by Reudink et al (U.S. 6,195,556). As has already been pointed out above in connection with the obviousness rejection of claim 1, Reudink et al do not define the distance between the transmitting station and the receiving station according to both a measurement and a characteristic parameter. The thing that is being determined by Reudink et al by means of the detailed map, the signal strength and/or time difference or arrival information and the knowledge of the multiple narrow beams is a location determination. This is different from the more fundamental determination of a

distance. According to the present invention, the distance is computed using the measured signal feature and the characteristic parameter. This is not shown by Reudink et al. Reudink et al use a feature of a signal such as signal strength to determine distance by itself and do not use that measurement in conjunction with a characteristic parameter to determine distance. Rather, the detailed map of Reudink et al is combined with the signal strength and/or time difference of arrival information as well as the narrow beam sector information to determine position, i.e., location, not distance.

Therefore, for the reasons just mentioned as well as the more lengthy reasons mentioned in connection with the obviousness rejection of claims 1-14, 19, and 24-27 above, the independent claim 15 is not anticipated by Reudink et al.

Regarding independent claim 23, it is limited in a manner similar to that of the other independent claims because it contains the limitation that a distance between the mobile station and the base station is defined according to the measurement data concerning a feature of the connection between the mobile station and the base station with the feature facilitating a determination of the distance therebetween and the characteristic parameter.

Thus, claim 23 is also not anticipated by Reudink et al and withdrawal of the 35 U.S.C. § 102(e) rejection of claims 15-18 and 20-23 is requested.

Regarding the obviousness rejection of claim 19, it has already been pointed out that Reudink et al explicitly state that the mapping technique that is used in their first embodiment is not applicable to the second and third embodiments which embodiments use multiple base stations (the first embodiment of Reudink et al does not use multiple base stations). Therefore, Reudink et al is inapplicable as a reference against claim 19 for the reasons stated above.

Regarding the obviousness rejection of claims 24-27 (see pages 9-11 of the Office Action), claim 24 claims an arrangement which is able to calculate the parameter of the radio propagation environment by means of a current geographical location of the first station as determined by a source of location

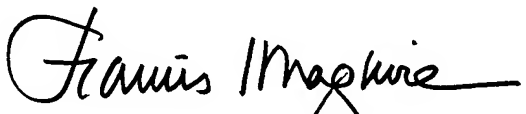
information that is external to the communication system and a feature of a radio signal received by one of the stations from another of the stations. Thus, the arrangement of claim 24 combines information about the geographical location of the first station with the radio signal feature that is determined as well to provide the parameter of the radio propagation environment. This arrangement serves to create the conditions under which the method of claim 1 and the device of claim 15 can operate.

The Examiner admits that Reudink et al do not explicitly disclose calculating means for calculating a parameter of the radio propagation environment by means of the current geographical location of the first station and the feature. The Examiner states that Reudink et al strongly suggests the use of road map that includes different signal attributes as related to the various environments encountered by the movement of the mobile device. However, that road map information is combined with signal attributes to determine location, not to calculate a parameter of the radio propagation environment. The fact that Reudink et al shows a road map that includes different signal attributes does not mean that it would have been obvious from that information to arrive at the claimed calculation means for calculating a parameter of the radio propagation environment by means of current geographical location and the signal feature information. That is simply not shown or even suggested by Reudink et al.

Withdrawal of the 35 U.S.C. § 103 rejection of claims 24-27 is requested.

The objections and rejections of the Office Action of July 12, 2004, having been obviated by amendment or shown to be inapplicable, withdrawal thereof is requested and passage of claims 1-27 to issue is solicited.

Respectfully submitted,



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